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5974536

L52: Entry 5 of 5

File: USPT

DOCUMENT-IDENTIFIER: US 5768500 A

TITLE: Interrupt-based hardware support for profiling memory system performance

Detailed Description Text (18):

However, there remains a fundamental intrusiveness problem whenever software instrumentation is inserted into frequently accessed regions of a program to gather fine-grained profiles using hardware counters. To get a sense of the magnitude of the resulting overhead of such a technique, the SPEC integer benchmarks are instrumented to access counters on procedure entry and exit. The overhead is measured in terms of impact on execution time. In practice, both a memory overhead profile and an execution time profile in a single run of the program, so perturbing execution time directly impacts the profile data. Also, it is expected that the profiling techniques will be applied to multithreaded programs where program behavior is highly dependent on the relative execution times of the threads. Therefore, monitoring techniques that impact execution time significantly will be suspect.

Detailed Description Text (94):

The present invention can easily support traditional measurements like number of network transactions and network utilization. But, due to the triggered interrupting capability, the present invention can relate these measurements to system state with little overhead. The present invention simply interrupts the program every time N units of resource are accumulated and record the program state. It is preferred that the present invention be configured to sample at random intervals with mean N units to avoid correlation problems. Obtaining similar data by incrementing software counters on every network transaction would perturb the system, potentially changing the relative execution time of events on different processors, and affecting total system performance in an unpredictable way. Traditional hardware counters without an interrupting capability would also be inadequate because they do not provide a mechanism for relating resource usage to specific resource users.



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Term:

L54 AND (REGISTER\$ SAME (CHANG\$ OR MODIF\$))

Display: **Documents in Display Format:** **Starting with Number** **Generate:** ☐ Hit List ☒ Hit Count ☐ Side by Side ☐ Image

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|------------|---|-------|------------|
| <u>L57</u> | L56 AND (INDICAT\$ WITH (CHANG\$ OR MODIF\$)) | 0 | <u>L57</u> |
| <u>L56</u> | L54 AND (REGISTER\$ SAME (CHANG\$ OR MODIF\$)) | 4 | <u>L56</u> |
| <u>L55</u> | L54 AND (REGISTER\$ SAME CHANG\$ OR MODIF\$) | 4 | <u>L55</u> |
| <u>L54</u> | L52 AND INTERRUPTS | 5 | <u>L54</u> |
| <u>L53</u> | L50 AND (hot spots) | 5 | <u>L53</u> |
| <u>L52</u> | L51 AND L50 | 5 | <u>L52</u> |
| <u>L51</u> | ((periodical\$ or regular\$ OR INTERVAL\$) same (interrupt\$ or stop\$ or suspen\$ or preempt\$) same (thread\$1 or process\$2 or program\$1 or application\$1 or task\$1)) | 21263 | <u>L51</u> |
| <u>L50</u> | (time near3 profil\$3) SAME (MULTI-THREAD\$ OR (MULTIPLE ADJ THREAD\$1) OR MULTITHREAD\$ OR THREAD\$) | 72 | <u>L50</u> |
| <u>L49</u> | L48 AND L19 | 13 | <u>L49</u> |
| <u>L48</u> | L36 AND (MULTI-THREAD\$ OR (MULTIPLE ADJ THREAD\$1) OR MULTITHREAD\$) | 60 | <u>L48</u> |

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|------------|---|------|------------|
| <u>L47</u> | L41 AND THREA | 0 | <u>L47</u> |
| <u>L46</u> | L41 and (time near3 profil\$3).ab. | 2 | <u>L46</u> |
| <u>L45</u> | L41 AND (CHANG\$ SAME THREAD\$1) | 0 | <u>L45</u> |
| <u>L44</u> | L43 AND L41 | 0 | <u>L44</u> |
| <u>L43</u> | ((709/100 709/101 709/102 709/103 709/104 709/105 709/106 709/107 709/108)!.CCLS.) | 2137 | <u>L43</u> |
| <u>L42</u> | L41 AND L24 | 0 | <u>L42</u> |
| <u>L41</u> | L39 AND (indicat\$ near5 chang\$) | 42 | <u>L41</u> |
| <u>L40</u> | L39 AND L12 | 0 | <u>L40</u> |
| <u>L39</u> | L37 AND L19 | 86 | <u>L39</u> |
| <u>L38</u> | L37 AND L1 | 64 | <u>L38</u> |
| <u>L37</u> | L36 AND (MULTI-THREAD\$ OR (MULTIPLE ADJ THREAD\$1) OR MULTI\$) | 2554 | <u>L37</u> |
| <u>L36</u> | (time near3 profil\$3) | 8630 | <u>L36</u> |
| <u>L35</u> | L34 AND (MULTI-THREAD\$ OR (MULTIPLE ADJ THREAD\$1) OR MULTI\$) | 0 | <u>L35</u> |
| <u>L34</u> | l31 AND PROFIL\$ | 3 | <u>L34</u> |
| <u>L33</u> | L31 AND CHANG\$ | 1 | <u>L33</u> |
| <u>L32</u> | L31 and (indicat\$ near5 chang\$) | 0 | <u>L32</u> |
| <u>L31</u> | l30 and register\$ | 3 | <u>L31</u> |
| <u>L30</u> | l13 and (interrupt\$ near5 application\$1) | 3 | <u>L30</u> |
| <u>L29</u> | L14 and interrup\$ | 0 | <u>L29</u> |
| <u>L28</u> | L14 and interrupt\$ | 23 | <u>L28</u> |
| <u>L27</u> | L26 and l22 | 0 | <u>L27</u> |
| <u>L26</u> | 717/? | 1564 | <u>L26</u> |
| <u>L25</u> | L24 and l22 | 0 | <u>L25</u> |
| <u>L24</u> | ((717/127)!.CCLS.) | 138 | <u>L24</u> |
| <u>L23</u> | L22 and (time near3 profil\$3).ab. | 1 | <u>L23</u> |
| <u>L22</u> | L21 and register\$ | 32 | <u>L22</u> |
| <u>L21</u> | L20 and (time near3 profil\$3) | 58 | <u>L21</u> |
| <u>L20</u> | L19 and (indicat\$ near5 chang\$) | 1158 | <u>L20</u> |
| <u>L19</u> | ((periodical\$ or regular\$) same (interrupt\$ or stop\$ or suspen\$ or preempt\$) same (thread\$1 or process\$2 or program\$1 or application\$1 or task\$1)) | 8905 | <u>L19</u> |
| <u>L18</u> | l14 and (interrupt\$ or stop\$ or suspen\$ or preempt\$) | 0 | <u>L18</u> |
| <u>L17</u> | l14 and (periodical\$ same (interrupt\$ or stop\$ or suspen\$ or preempt\$)) | 0 | <u>L17</u> |
| <u>L16</u> | l14 and (interrupt\$ same thread\$1) | 0 | <u>L16</u> |
| <u>L15</u> | L14 and l1 | 0 | <u>L15</u> |
| <u>L14</u> | 6055492.pn. | 1 | <u>L14</u> |
| <u>L13</u> | L12 and l1 | 3 | <u>L13</u> |
| <u>L12</u> | (time near3 profil\$3) same thread\$1 | 48 | <u>L12</u> |

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|------------|---|--------|------------|
| <u>L11</u> | l9 and thread\$ | 2 | <u>L11</u> |
| <u>L10</u> | L9 and l1 | 0 | <u>L10</u> |
| <u>L9</u> | (time near3 profil\$3).ti. | 6 | <u>L9</u> |
| <u>L8</u> | L6 and (time near3 profil\$3).clm. | 0 | <u>L8</u> |
| <u>L7</u> | L6 and (time near3 profil\$3).ab. | 0 | <u>L7</u> |
| <u>L6</u> | L5 and (time near3 profil\$3). | 21 | <u>L6</u> |
| <u>L5</u> | L2 and register\$ | 469 | <u>L5</u> |
| <u>L4</u> | L and register\$ | 106195 | <u>L4</u> |
| <u>L3</u> | L2 and (register\$ same data same thread\$ same chang\$) | 0 | <u>L3</u> |
| <u>L2</u> | L1 and (indicat\$ near5 chang\$) | 855 | <u>L2</u> |
| <u>L1</u> | (periodical\$ same (interrupt\$ or stop\$ or suspen\$ or preempt\$) same (thread\$1 or process\$2 or program\$1 or application\$1 or task\$1)) | 5831 | <u>L1</u> |

END OF SEARCH HISTORY